Amendments to the Drawings:

In the DRAWINGS Section, please replace Fig. 7 with the attached Replacement Sheet. To indicate the "steady transition area", and the "signal cut-off edges" of said steady transition area, appropriate marker lines and descriptive Symbols are added: "**Steady Transition Area**" marks the area of steady ramp-up/ramp-down; "**CutOff Lo**" and "**CutOff Hi**" mark the low side and the high side of the steady transition area, where the signal cut-off (purposely) takes effect. Corresponding description can be found on page 20, last paragraph to page 21, first paragraph.

Attachment: Replacement Sheet

REMARKS/ARGUMENTS

In response to the subject Office Action, an Amendment to the Specifications and to the Claims section is herein submitted.

Examiner Nguyen is thanked for thoroughly reviewing the above referenced patent application, and for the indication of allowability once various formal matters and informalities are corrected.

Remarks and Arguments on Claim Rejections due to 35 USC §112

1. Reconsideration of the rejection of claims 1-52 as being indefinite is requested, based on the following.

2. Regarding claim 1, the recitations "a circuit to individually provide the threshold points to each individual capacitor switching stage" additional explanation is provided in page 18, 2nd paragraph and page 20, last paragraph, as follows:

. The combination of one translinear amplifier **Tr.Amp k**, combined with adequate control circuit and one switching device **Sw k** could be considered as an individual capacitor switching stage, where one of said capacitor switching stages connects to one capacitor **Cap k** out of a set of small capacitors. Each of said capacitor switching stages is controlled through the common input **Vtune** and an individual input **Ref-in k**, All of these stages k = 1 to n have basically identical functional characteristics.

To further overcome the ambiguity of "what are two different circuits: 'a set of circuits' and 'a set of translinear amplifier stages'", the term "translinear amplifier stages" is replaced throughout the document with "translinear amplifiers" and, with the above cited additional description, it is now made clear, that each capacitor switching stage contains one translinear amplifier. And even further, the structure of the independent claims is changed, to teach, the translinear amplifier and the switching device being circuits within said capacitor switching stages.

1. A circuit to control the capacitance of a variable capacitor in a strictly linear mode through a steady tuning voltage and to achieve a high Q-factor at the same time; comprising:
a set of individual small capacitors;
a set of capacitor switching stages, comprising;
a switching device, allowing a steady ramp-up/ramp-down phase between the points of being fully switched on and fully switched off, and where said switching device is connected in series with one ofsaid capacitors, to connect a multiple of said capacitors in parallel;
a circuit to control the switching operation in a ramp-up/ramp-down manner between the points of being fully switched on and fully switched off, provided to said switching device;
a translinear amplifiers to produce the ramp-up/ramp-down signal for each of said set of switching devices, where said translinear amplifier is implemented within said circuit to control the switching operation;
a circuit to individually provide the threshold points for each of said capacitor switching stages; and
a circuit to provide a signal, dependent on the tuning voltage, dedicated for the voltage controlled capacitance change, to the inputs of all of said capacitor switching stages.

33. A method to control the capacitance of a variable capacitor in a strictly linear mode through a tuning voltage and to achieve a high Q-factor at the same time; comprising:
providing a set of individual small capacitors, a set of capacitor switching stages, comprising: a switching device allowing a steady ramp-up/ramp-down phase between the points of being fully switched on and fully switched off, and where said switching device is connected in series with one of said capacitors, to connect a multiple of said capacitors in parallel, a circuit to control the switching operation in a ramp-up/ramp-down manner between the points of being fully switched on and fully switched off, provided to said switching device, a translinear amplifier to produce said control signal for said ramp-up/ramp-down switching, operation, and a circuit to individually provide the threshold points for each of said capacitor switching stages, a circuit to provide a signal, dependent on the tuning voltage, dedicated for the voltage controlled capacitance change, to all of said capacitor switching stages;
providing said threshold points for each individual capacitor switching stage;
supplying said signal, dependent on the tuning voltage, dedicated for the voltage controlled capacitance change, to all of said capacitor switching stages;

amplifying, by means of a translinear amplifier, the difference of said capacitance tuning voltage and said threshold points within each capacitor switching stage to produce the linear control signal for a ramp-up/ramp-down switching operation;

fully switching on one of said switching devices in order to completely switch one of said small capacitors in parallel to the already switched on capacitors, one after the other to linearly increase the total capacitance;

fully switching off one of said switching devices in order to completely disconnect one of said small capacitors from the other switched on capacitors, one after the other, to linearly decrease the total capacitance; and

ramping up or ramping down the switching operation of one of said switching devices to partially switch, with increasing/decreasing share, one of said small capacitors in parallel to the already switched on capacitors, one after the other.

The above changes and amendments to claim 1 and 33 apply in the same way to claims 6, 17, 26, 38, 42, 43 and 47. The certain method phrases in claims 33, 43 and 47 are rearranged in their sequence, without changing their content, to better match with the new structure in claims 1, 17 and 26. The above amendments should overcome the majority of deficiencies.

3. Regarding claim 18-21, the recitation " wherein said circuit to drive said switching device to a fully-on status, when said switching device is outside its desired steady transition area on the lower resistance side is provided by additional circuit elements, working as _a signal-limiting function" in claim 18 is indefinite because it is not clear what "working as a signal-limiting function" is meant by.

A distinct reference to US Patent Application Serial No. 10/764920 for the specific item of “additional circuit elements for a signal limiting function” was already included in the initial application; said reference is now amended to specifically point to the circuit elements ADD-COMP 1-7 and ADD-COMP 2-7.

References to US Patent Application Serial No. 10/764920 for the specific item of "additional circuit elements for a signal limiting function" were included several times in the initial application, with the clear intent to include the details of said additional circuit elements into the application and to incorporate the subject application by reference, even though the words "incorporated by reference"were not used.

4. Anticipating the allowance, the two specific references are now amended as follows; mark-ups are shown. On page 6,3rd full paragraph:

Additional circuit elements, described in the related US Patent Application, Serial No. 10/676919, filed Oct. 1, 2003, ~~and~~ titled "Translinear Amplifier" and hereby incorporated by reference, implement a signal-limiting function and provide a signal to sharply cut off said translinear amplifier's linear operation, once the defined linear operating range is exceeded at the negative end of said linear operating range; and to sharply limit said translinear amplifier's linear operation, once the linear operating range is exceeded at the positive end of said linear operating range. The circuits of said signal limiting functions then either overdrives said switching transistor either into deep saturation (RDSon going to 0) or overdrives it into its extreme off state (RDSoff going very high) when said switching device is outside its desired steady transition phase.

And on page 19, last paragraph to page 20 first pragraph:

Another key point of the invention is the implementation of ~~a~~ signal-limiting functions at both ends of the steady switching transition area. As long as the switching transistor is kept within its steady transition phase (RDS changing mode) the resistance of the transistor linearly follows the input difference of said translinear amplifier. Once the signal controlling the switching device leaves the desired steady transition area, the signal condition is now changed abrupt by one of the signal limiting circuits. **Fig. 7** visualizes this effect. The purpose is to overdrive said switching device to a fully-on state, when said switching device is outside its desired steady transition area on the lower resistance side and to overdrive said switching device to a fully-off status, when said switching device is beyond its steady transition area on the higher resistance side. Additional circuit elements, implementing said signal-limiting function, drive said switching transistor either into deep saturation (RDSon going to 0) or drive it into its extreme off state (RDSoff going very high) as soon as said switching device falls outside said desired steady transition area. Such signal-limiting functions could, according to the invention, be implemented within said translinear amplifier circuit, as it is shown in **Fig. 7** of ~~the referenced~~ Patent Application US Serial No. 10/676919, filed Oct. 1, 2003 and hereby incorporated by reference. The relevant additional signal limiting function is presented there with the circuits **ADD-COMP 1-7** and **ADD-COMP 2**. Said signal-limiting functions could however be implemented as separate circuits external to said translinear amplifier as well.

The referenced text in US Pat. App. No. 10/676919 reads as follows:

Fig. 7 shows the circuit of **Fig. 6** with the additional limiting transistor function, where the additional components are shown inside the dashed frames, marked with **ADD-COMP 1-7** and **ADD-COMP 2-7**. According to said second aspect of this invention, two additional circuit functions sharply limit the analog operating region through an extra current limiting transistor on one side and the purposely use of the voltage limited by the power supply on the other side. Transistor **N13-7** incorporates said current limiting transistor. Transistor **N3-7** takes a current probe of said first current dividing circuit, built by transistors **N1-7**, **N2-7** and **N4-7** and mirrors it through **N16-7** to said current limiting transistor **N13-7**. As soon as the current drawn by **N13-7** exceeds the current provided by **N8-7**, **N13-7** sinks all available current and the output is cut-off.

Similar, when the output voltage **Voutp-7** swings **Vdd**, further voltage increase is suddenly impossible, thus sharply limiting said linear operation region.

5. Examiner had requested clear explanation on the recited "additional circuit elements, working as a signal-limiting function". Applicant is convinced, the required explanation is provided with the reference to US Patent Application, Serial No. 10/676919, with the now amended specification and drawing and with the use of amended referencing language.

Applicant is convinced, amending the reference to US Pat. App. No. 10/676919 with the required specific referencing language, does definitely not imply the introduction of new matter, as the intent to reference to the "additional circuit elements for a signal limiting function" in said referenced application was clearly expressed in applicant's initial application, as filed.

6. Regarding claim 23, the recitation "which gives one more degree of freedom to optimize operating parameters, like overlapping of capacitor switching operation and signal cut-off at the edges of the steady transition area." is indefinite because it is not clear what is the "signal cut-off at the edges of the steady transition area." is meant by and how to perform the "overlapping of capacitor switching operation". additional explanation is provided in page 9, last paragraph (for "one more degree of freedom") and on page 20,

last paragraph to page 21, first paragraph (for "steady transition area" and for "cut-off edges"). For the same purpose, Fig. 7 is amended with additional descriptions.

Further, regarding claim 23, the "overlapping of capacitor switching operation" is nothing to perform on purpose, it is a heritage of each capacitor switching stages and can not be avoided. The measure of overlapping depends on the slope of each switching stage's ramp-up and the individually selected distance of the threshold points, where the slope can be adjusted through the translinear amplifier's gain. See Fig. 4b and its description on page 17, 2nd paragraph.

Similar, the amended drawing and description in the specification should remove the problems with claims 44 and 45, being indefinite. The description of steady ramp-up/ramp-down phase, steady transition and steady transition phase was amended with the previous office action (page 15, 1st paragraph) and is further amended with the present office action. The description, what is meant with " when said switching device is outside its desired steady transition" is amended there as well.

7. Regarding claim 31, the recitation "a circuit to provide a non-linear relation between said tuning voltage and said threshold points is provided... in a way, to achieve said desired non-linear relation" being indefinite additional explanation is presented. The 2nd full paragraph on page 21 is amended to the following:

Typically, it would be desirable to achieve a linear relation between the tuning voltage and the capacitor variation, i.e. in a strictly linear mode. Then the reference voltages to compare with the tuning voltage would normally be equally spaced. However, t~~T~~o achieve a steady, but predefined non-linear relation instead, other reference voltage steps for said threshold points could also be selected, like spacing

along a parabolic curve. As explained before, one circuit example is said resistor chain **R1** to **Rn**, or a similar circuit, to produce a series of voltage references **Ref 1** to **Ref n**, where each of said translinear amplifiers compares the tuning voltage with its dedicated reference voltage. To achieve a non-linear relation between reference points and tuning voltage, a set of reference voltages will be provided, that are, instead of being equally spaced, spaced along a desired non-linear curve. As one suggested embodyment, such non-linear relation can be achieved by appropriate selection of the values of said resistor chain **R1** to **Rn.** Similar, the tuning voltage could be split into a multiple of tuning signals to feed them to the translinear amplifier inputs. Depending on the technique to implement the reference values defining said threshold points for each of the amplifiers within said translinear amplifier chain, specific nonlinear relations of capacitance change versus tuning voltage can be constructed. The concept of said non-linear relation is demonstrated in **Fig. 12**, with **Curve A** and **Curve B** as examples.

In addition, independent claims 29 and 50 are cancelled. Claims 30, 31, 32 and 51, 52, previously dependent to claims 29 and 50 are now changed to be dependent to claims 1 and 33 respectively. The references in these claims are amended to reflect the new dependence.

Reconsideration of the above rejection (or objection) is therefore respectfully requested.

All claims are now believed to be in condition for allowance, and allowance is so requested.

It is requested that should there be any problems with this Amendment, please call the undersigned Attorney at (845) 452-5863.

Respectfully submitted,

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